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Ganapathy

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(54) **SYSTEMS AND METHODS FOR ROUTING CELLULAR NETWORK CALLS OR DATA USING A COMMUNICATIONS DEVICE**

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H04W 28/02	(2009.01)
H04W 88/04	(2009.01)

(52) **U.S. Cl.**

CPC ***H04W 28/0205*** (2013.01); ***H04W 88/04*** (2013.01)

(58) **Field of Classification Search**

USPC 455/445, 11.1, 426.1, 404.2, 436, 513, 455/12.1, 13.1, 466, 417, 3.02, 3.01, 557, 455/88, 422.1; 370/315, 229, 238, 252; 379/219, 220.01; 710/310, 106, 2, 313, 710/306

See application file for complete search history.

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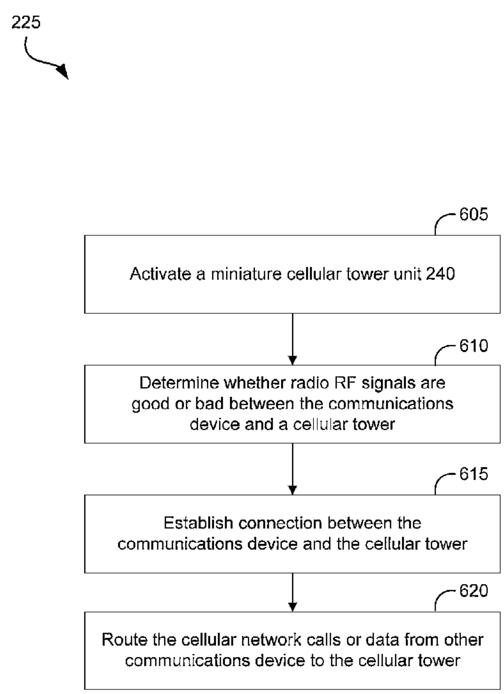
(57) **ABSTRACT**

A method, system and apparatus for providing better cellular network coverage and establishing a new cellular network technology infrastructure are provided. A representative apparatus is a communications device that includes a processing device, memory, a transceiver, and a miniature cellular tower unit. The memory includes a routing manager which has instructions that are executed by the processing device. The instructions include logics that facilitate making and receiving cellular network calls from and to the communications device. The transceiver transmits and receives radio frequency (RF) signals to and from a cellular tower and to and from at least one other communications device. The miniature cellular tower unit routes RF signals from the at least one other communications device to the cellular tower.

19 Claims, 11 Drawing Sheets



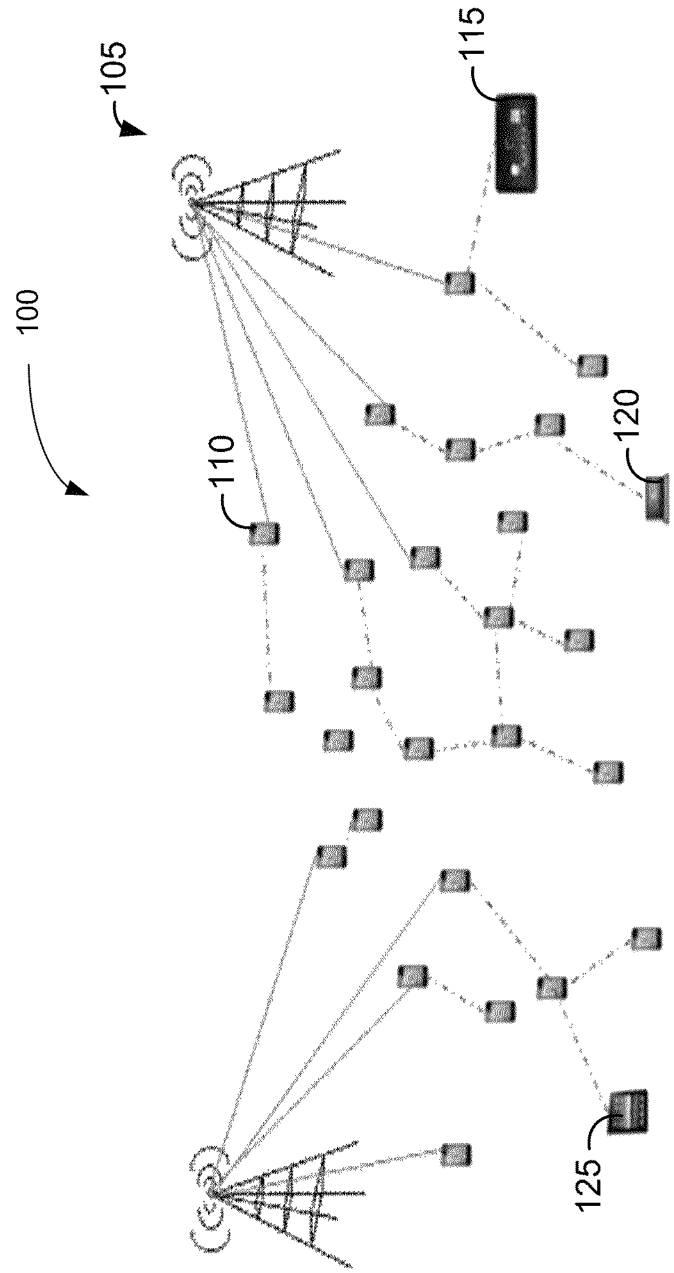
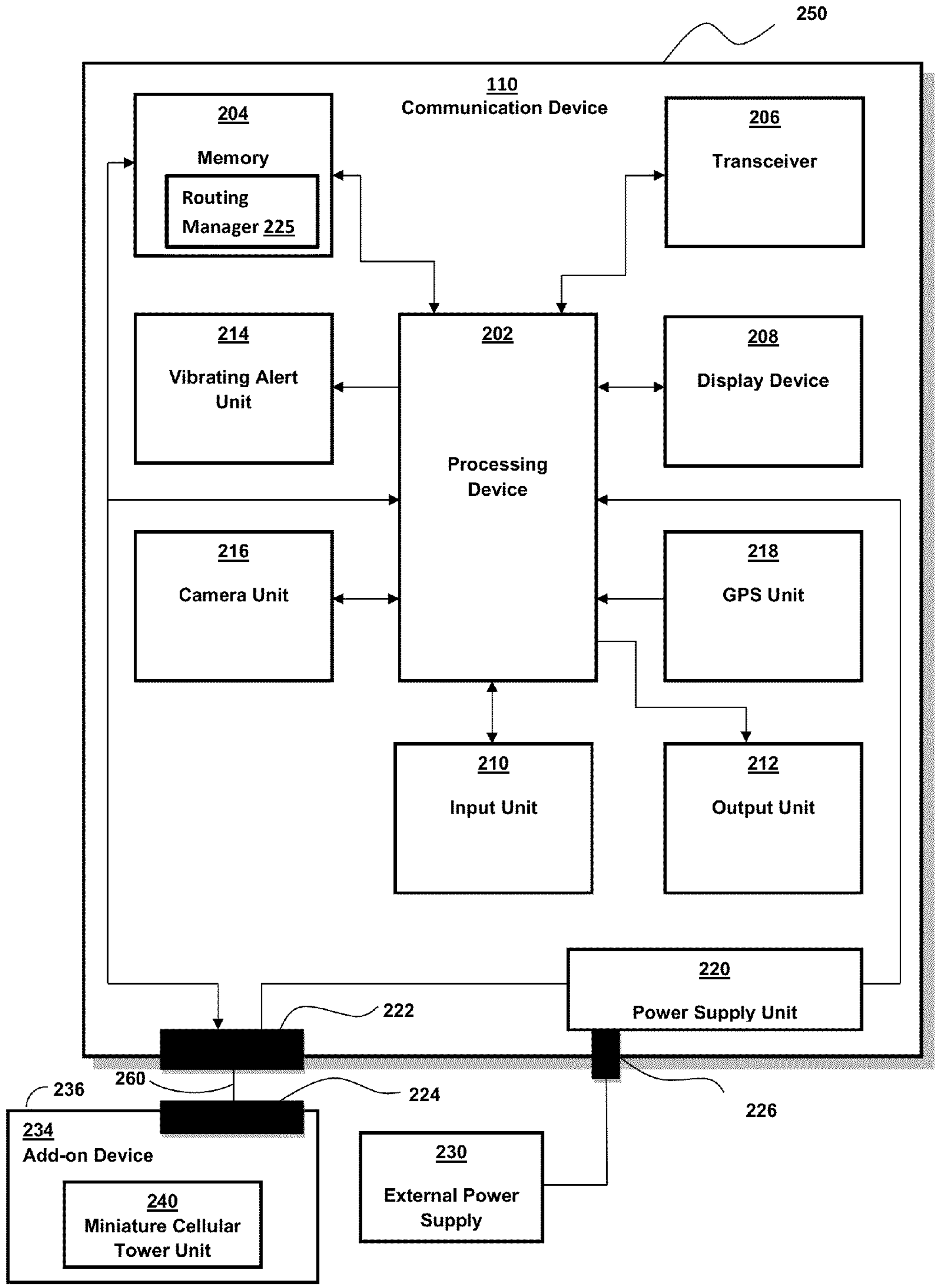


FIG. 1

FIG. 2


250
110
Communication Device
204
Memory
Routing
Manager 225
206
Transceiver
214
Vibrating Alert
Unit
202
Processing
Device
208
Display Device
216
Camera Unit
218
GPS Unit
210
Input Unit
212
Output Unit
220
Power Supply Unit
222
260
224
226
236
234
Add-on Device
240
Miniature Cellular
Tower Unit
230
External Power
Supply

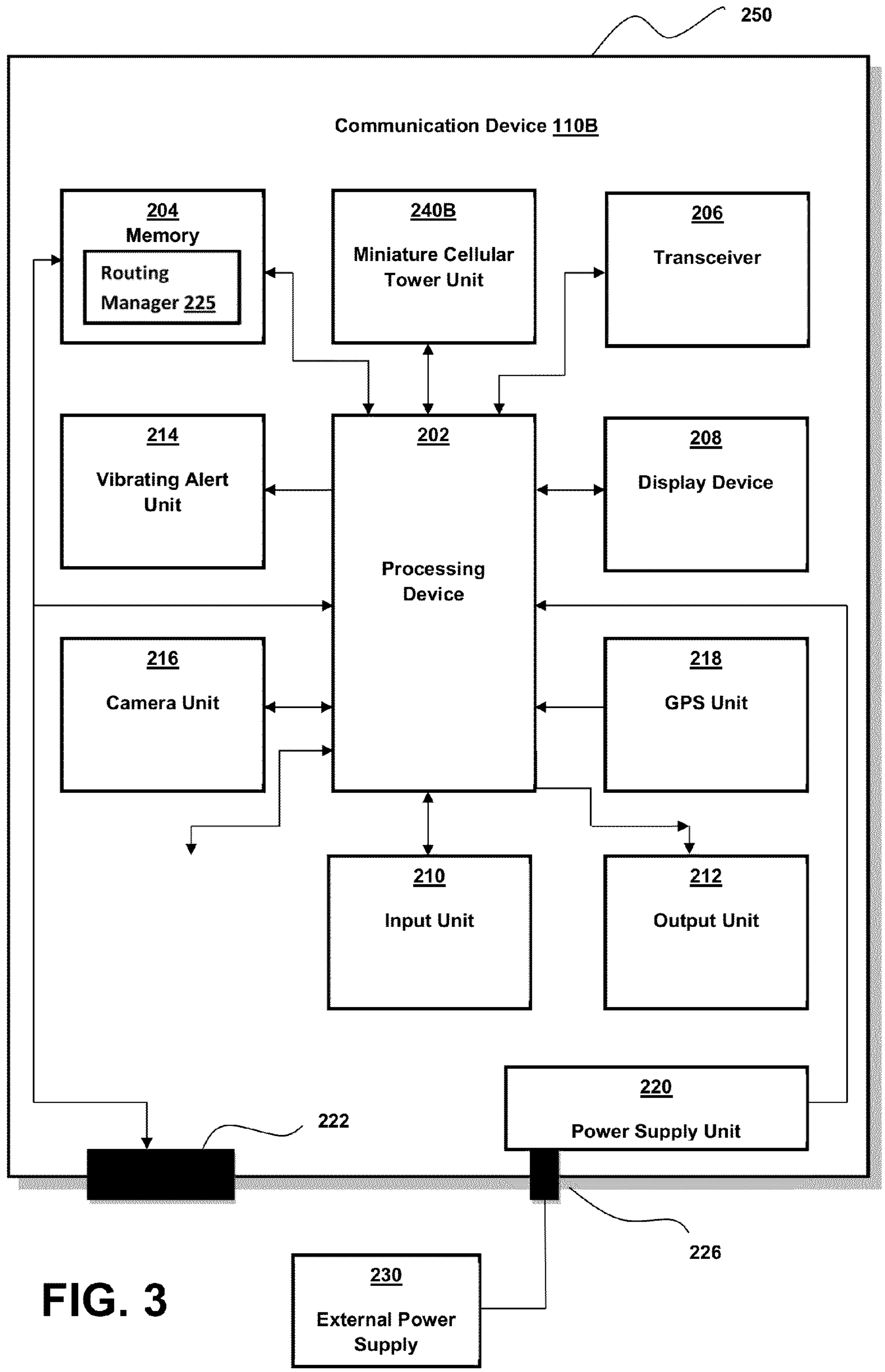

250
Communication Device 110B
204
Memory
Routing Manager 225
240B
Miniature Cellular Tower Unit
206
Transceiver
214
Vibrating Alert Unit
202
Processing Device
208
Display Device
216
Camera Unit
218
GPS Unit
210
Input Unit
212
Output Unit
220
Power Supply Unit
222
226
230
External Power Supply

FIG. 3

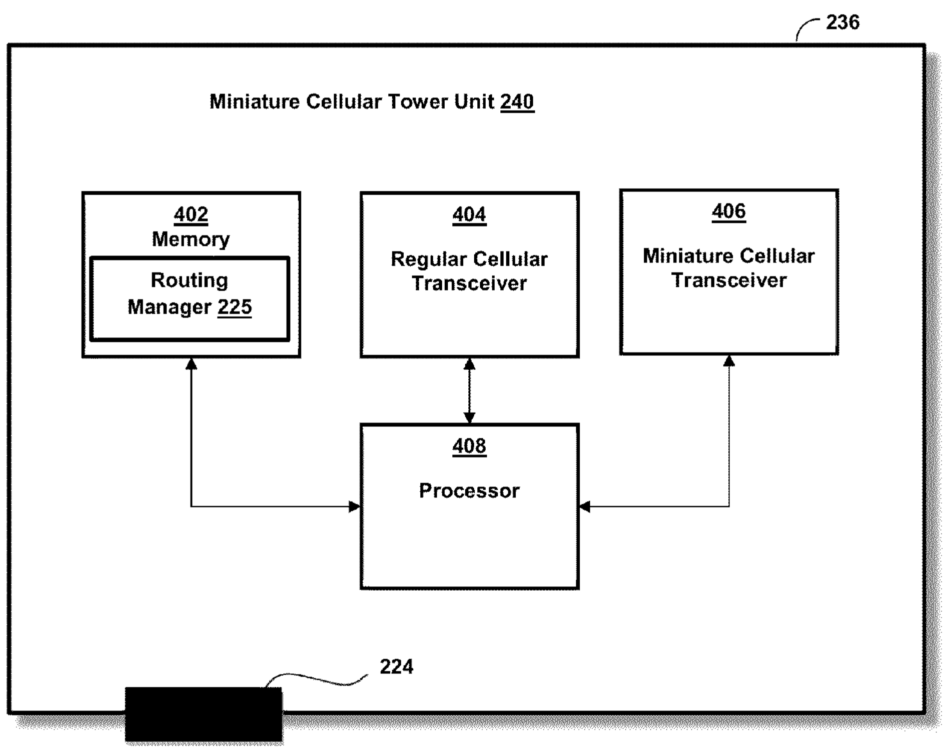

236
Miniature Cellular Tower Unit 240
402
Memory
Routing Manager 225
404
Regular Cellular Transceiver
406
Miniature Cellular Transceiver
408
Processor
224

FIG. 4

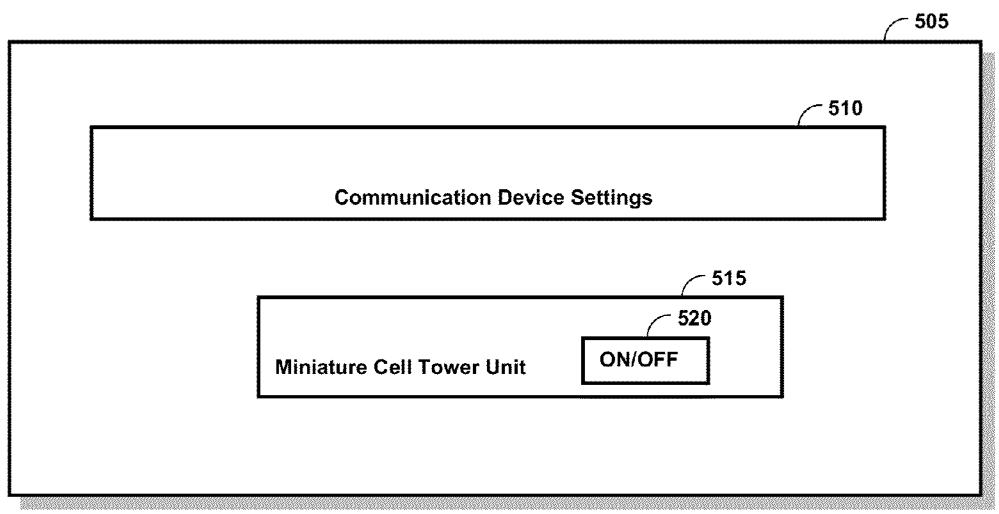

505
510
Communication Device Settings
515
520
Miniature Cell Tower Unit
ON/OFF

FIG. 5

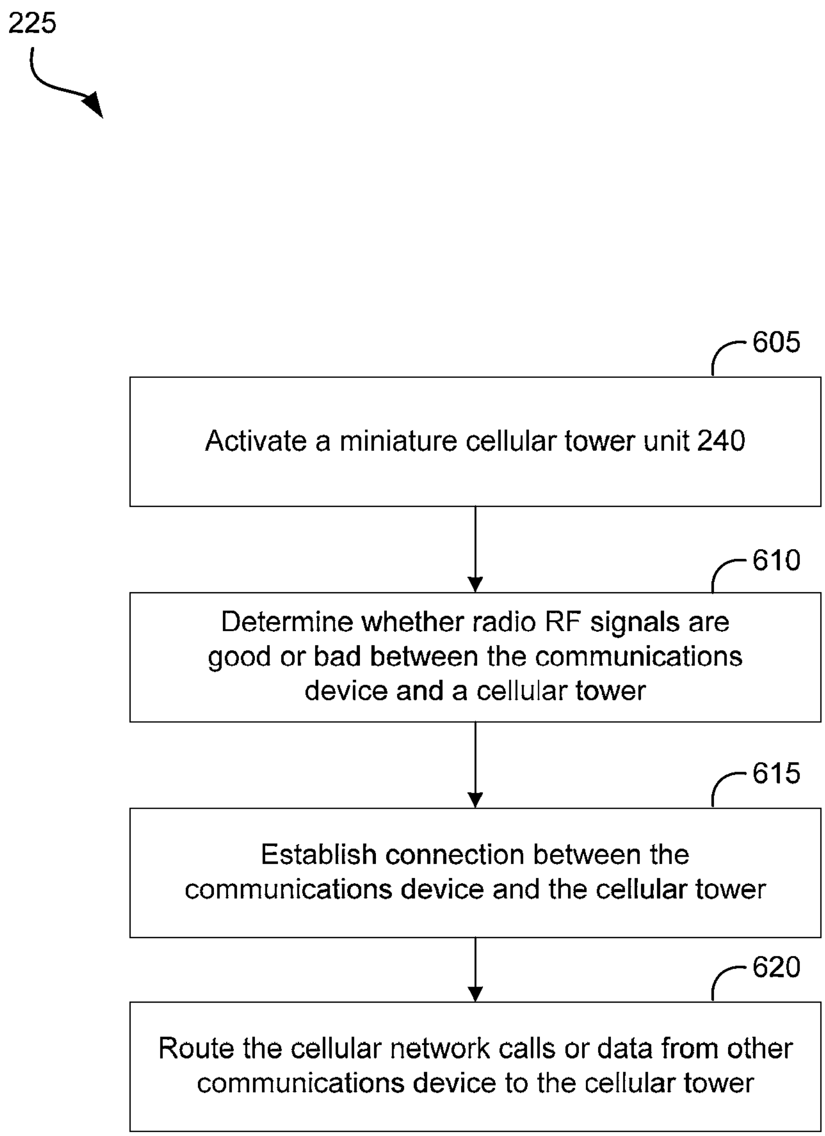

225
605
Activate a miniature cellular tower unit 240
610
Determine whether radio RF signals are good or bad between the communications device and a cellular tower
615
Establish connection between the communications device and the cellular tower
620
Route the cellular network calls or data from other communications device to the cellular tower

FIG. 6

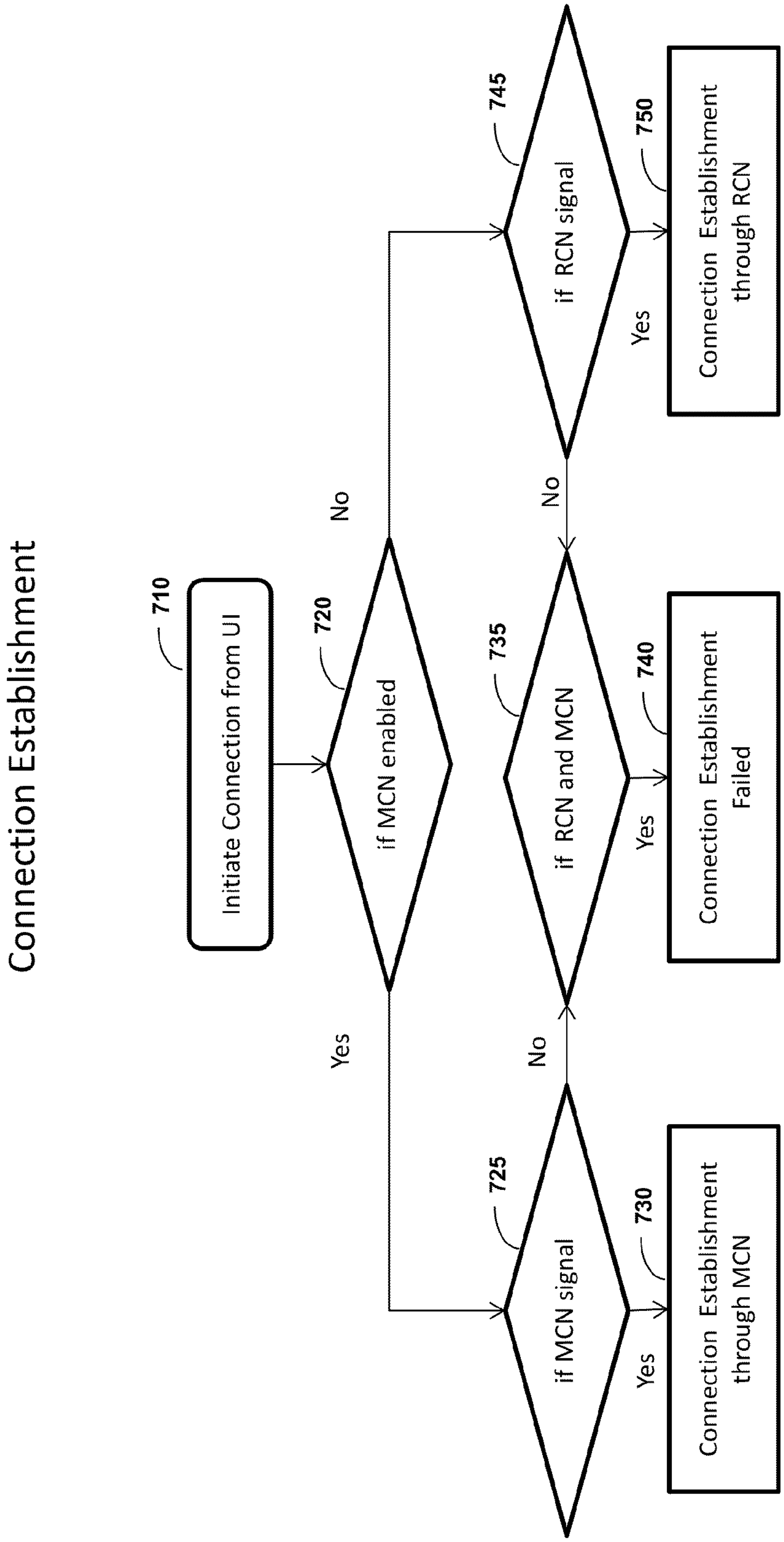

Connection Establishment
710
Initiate Connection from UI
720
if MCN enabled
Yes
No
725
if MCN signal
Yes
730
Connection Establishment through MCN
No
735
if RCN and MCN
Yes
740
Connection Establishment Failed
745
if RCN signal
Yes
750
Connection Establishment through RCN
No

FIG. 7

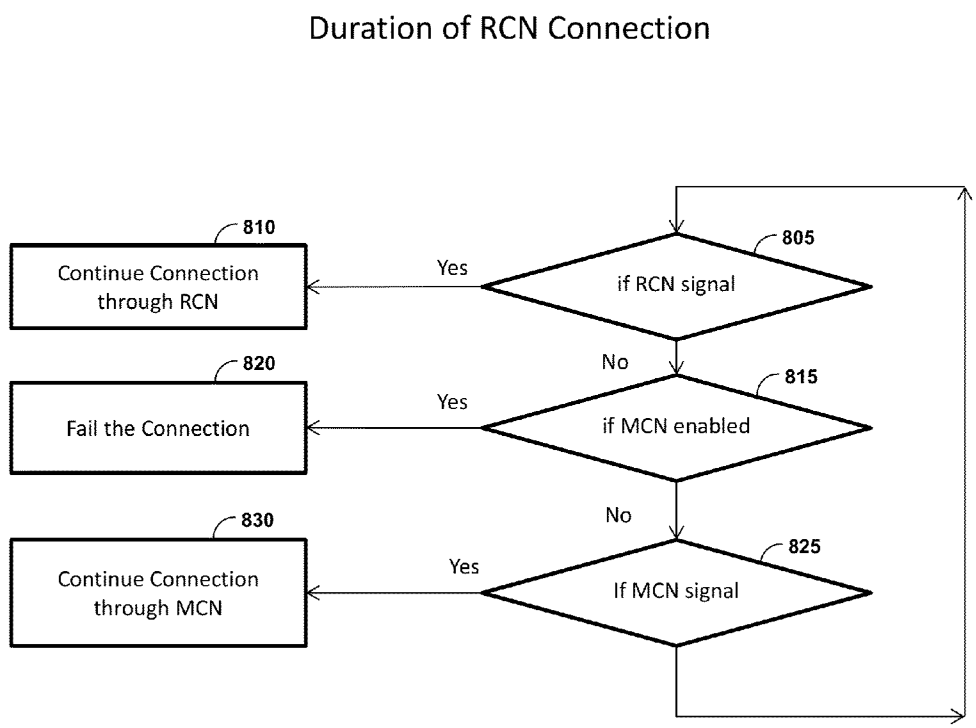

Duration of RCN Connection
810
Continue Connection through RCN
Yes
805
if RCN signal
No
820
Fail the Connection
Yes
815
if MCN enabled
No
830
Continue Connection through MCN
Yes
825
If MCN signal

FIG. 8

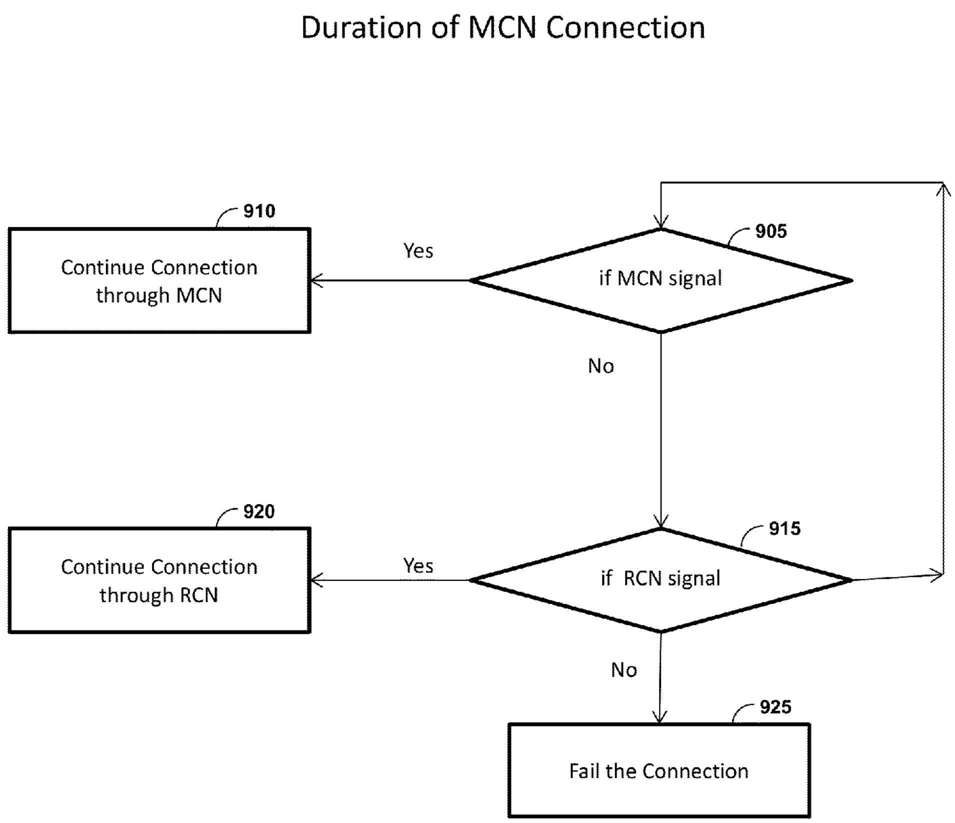

Duration of MCN Connection
910
Continue Connection through MCN
Yes
905
if MCN signal
No
920
Continue Connection through RCN
Yes
915
if RCN signal
No
925
Fail the Connection

FIG. 9

Steps involved in the communication between the cellular tower and the communication device and between communication devices

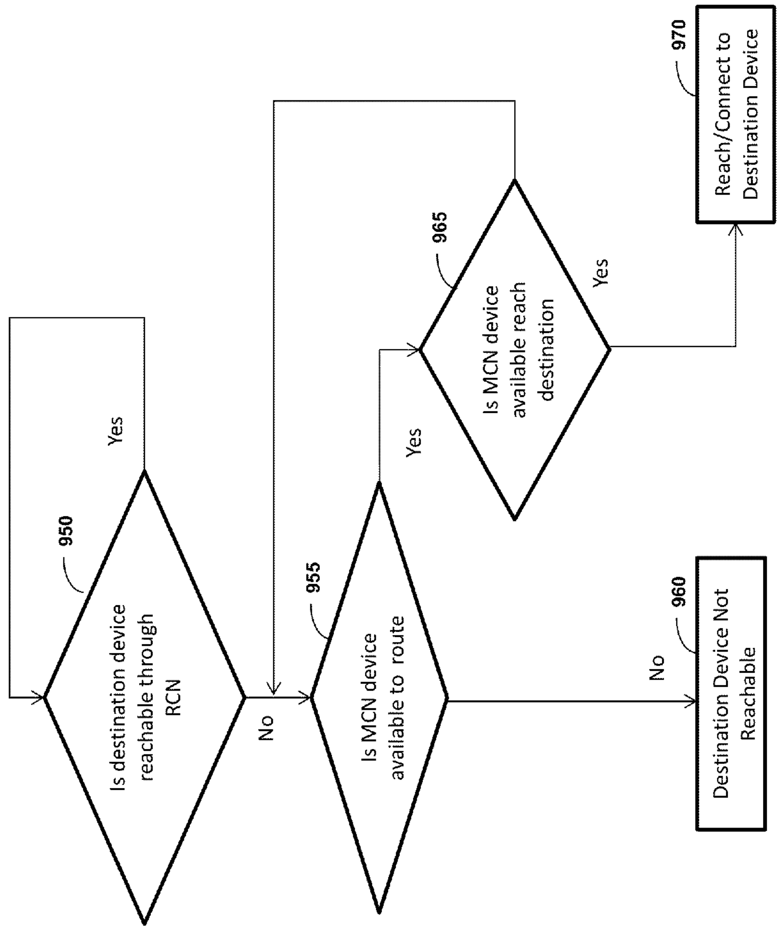


FIG. 10

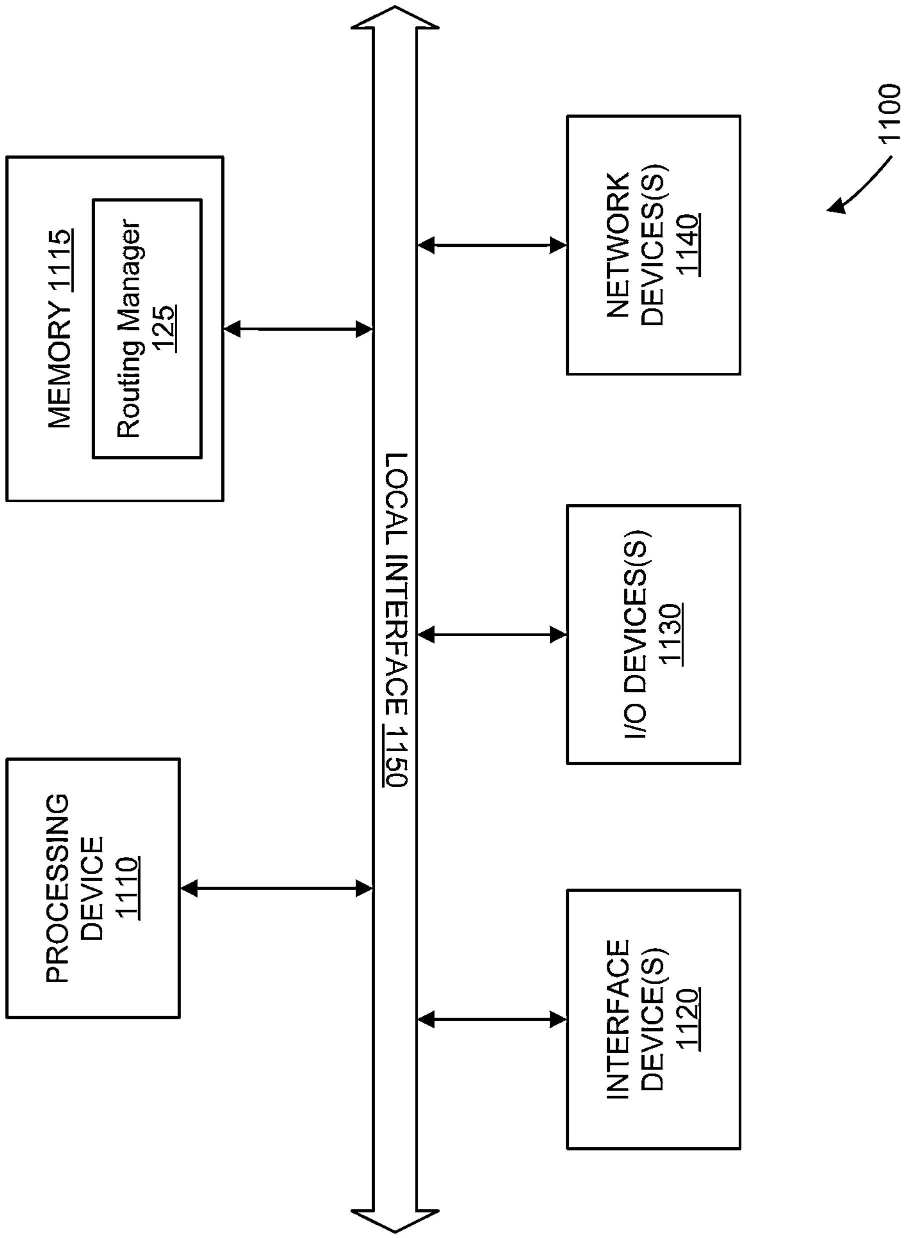

MEMORY 1115
Routing Manager
125
PROCESSING
DEVICE
1110
LOCAL INTERFACE 1150
NETWORK
DEVICES(S)
1140
I/O DEVICES(S)
1130
INTERFACE
DEVICE(S)
1120
1100

FIG. 11

SYSTEMS AND METHODS FOR ROUTING CELLULAR NETWORK CALLS OR DATA USING A COMMUNICATIONS DEVICE

TECHNICAL FIELD

The present disclosure is generally related to communications devices and, more particularly, is related to systems and methods for routing cellular network calls or data using a communications device.

BACKGROUND

Usage of cellular phones has increased and has become the primary phone for individuals in a household. The number of mobile devices sold in a year has exceeded the number of personal computers sold. Social networks, gaming, business and personal use that are on the go have triggered a substantial increase in the usage of such devices. These devices are becoming more and more powerful and come in varying sizes, mostly smaller so that it can be hand held. Also, now IPV6 is becoming a standard as the internet protocols (IPs) of IPV4 have been exhausted. With the increases in many such devices, particularly mobile devices, the cellular network congestion has increased specially in densely populated areas resulting in dropped calls and intermittent access to the Internet through cellular network.

The cellular companies have been transitioning to newer and faster network technology infrastructure to provide better and faster service to its customers. The transition of newer and faster network technology infrastructure by the cellular companies takes time and monies to install and establish the new network infrastructure.

SUMMARY

A method, system and apparatus for providing better cellular network coverage and establishing a new cellular network technology infrastructure are provided. A representative apparatus is a communications device that includes a processing device, memory, a transceiver, and a miniature cellular tower unit. The memory includes a routing manager which has instructions that are executed by the processing device. The instructions include logics that facilitate making and receiving cellular network calls from and to the communications device. The transceiver transmits and receives radio frequency (RF) signals to and from a cellular tower and to and from at least one other communications device. The miniature cellular tower unit routes RF signals from the at least one other communications device to the cellular tower.

Other systems, devices, methods, features of the invention will be or will become apparent to one skilled in the art upon examination of the following figures and detailed description. It is intended that all such systems, devices, methods, features be included within the scope of the invention, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF DRAWINGS

Many aspects of the disclosure can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Moreover, in the drawings, the reference numerals designate corresponding parts throughout the several views. While several embodiments are described in connection with these drawings, there is no intent to limit the disclosure to the embodiment or embodiments disclosed herein. On the contrary, the intent is to cover all alternatives, modifications, and equivalents.

FIG. **1** is a block diagram that illustrates an embodiment of a system having a communications device that facilitates routing cellular network calls or data;

FIG. **2** is a block diagram that illustrates an embodiment of a communications device, such as that shown in FIG. **1**;

FIG. **3** is a block diagram that illustrates another embodiment of a communications device, such as that shown in FIG. **1**;

FIG. **4** is a block diagram that illustrates an embodiment of a miniature cellular tower unit, such as that shown in FIG. **1**;

FIG. **5** is a view that illustrates an embodiment of an activation graphic user interface (GUI) that can activate a miniature cellular tower unit, such as that shown in FIG. **4**;

FIG. **6** is a high-level flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager, such as that shown in FIG. **1**, that facilitates routing cellular network calls or data using a communications device;

FIG. **7** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager, such as that shown in FIG. **2**, that establishes connection for routing cellular calls and data;

FIG. **8** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager, such as that shown in FIG. **2**, that routes cellular calls and data during regular cellular connection;

FIG. **9** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager, such as that shown in FIG. **2**, that routes cellular calls and data during miniature cellular connection;

FIG. **10** is a high-level flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager, such as that shown in FIG. **1**, that routes cellular calls and data during miniature cellular connection; and

FIG. **11** is a block diagram illustrating an exemplary architecture for a generic computer that is similar to the architecture of the computing device, local server and central server, such as that shown in FIG. **5**.

DETAILED DESCRIPTION

Exemplary systems are first discussed with reference to the figures. Although these systems are described in detail, they are provided for purposes of illustration only and various modifications are feasible. After the exemplary systems are described, examples of flow diagrams of the systems are provided to explain the manner in which cellular network calls or data are routed using a communications device.

FIG. **1** is a block diagram that illustrates an embodiment of a system **100** having a communications device that facilitates routing cellular network calls or data. The system **100** can include a cellular network infrastructure **100** that includes a cellular tower **105** and at least one communications device **110**. Such communications device **110** can include, but is not limited to, a cellular phone, a smart phone, a personal device assistant (PDA) devices, and among other hand-held devices.

The communications devices **110** communicate among each other and the cellular towers **105** to facilitate routing cellular network calls and data. The functionality and operation of the communications device **110** is further described below. The communications devices **110** can be connected to other computing devices, such as a desktop computer **115**, a laptop **120**, and a tablet **125**. The communications devices **110** can route cellular network calls or data to these other computing devices.

FIG. **2** is a block diagram that illustrates an embodiment of a communications device **110**, such as that shown in FIG. **1**. The communications device **110** includes a processing device **202** and memory **204**. Such memory **204** includes a routing manager **225** which has instructions that are executed by the processing device **202**. The instructions including logics that facilitate making and receiving cellular network calls from and to the communications device. The communications device **110** further includes a transceiver **206** that transmits and receives radio frequency (RF) signals to and from the cellular tower **105** (FIG. **1**) and to and from at least one other communications device **110**.

In this example, a miniature cellular tower unit **240** is designed to be part of an add-on device **234**, which is electrically coupled to the communications device **110** by way of a first data port **222** and a second data port **224**, such as universal serial bus (USB) connectors, mini-USB connectors, micro-USB connectors, among others. The miniature cellular tower unit routes RF signals from the at least one other communications device **110** (FIG. **1**) to the cellular tower **105**. The routed RF signals are associated with the cellular network calls and cellular network data.

The first data port **222** is electrically coupled to the memory **204** and processing device **202** of the communications device **110** and connects to the second data port **224** of the miniature cellular tower unit **240** using a data cable **260**. The add-on device **234** includes a housing **236** that contains the miniature cellular tower unit **240**. The miniature cellular tower unit **240** can obtain its power from a power supply unit **220** of the communications device **110** via data ports **222**, **224**. The miniature cellular tower unit **224** is further described below.

The power supply unit **220** also provides power to at least a portion of the electrical components at the communications device **110**, the electrical components of which include, but are not limited to, processing device **202**, memory **204**, transceiver **206**, display device **208**, input unit **210**, output unit **212**, vibrating alert unit **214**, camera unit **216**, GPS unit **218**, and routing manager **225**. An external power supply **230** can provide power to the communications device **110** and recharge the power supply unit **220** via power connector **226**. It should be noted that a housing **250** of the communications device **110** contains at least a portion of the electrical components mentioned above.

FIG. **3** is a block diagram that illustrates another embodiment of a communications device **110**, such as that shown in FIG. **1**. In this example, the architecture of the communications device **110**B of FIG. **3** is similar to the architecture of the band communications device **110** as described in FIG. **2**. Like features are labeled with the same reference numbers, such as the processing device **202**, memory **204**, transceiver **206**, display device **108**, input unit **210**, output unit **212**, vibrating alert unit **214**, camera unit **216**, GPS unit **218**, communications connector **222**, power supply unit **220** and the external power supply **230**.

In this example, the communications device **110**B is configured to further include a miniature cellular tower unit **240**B that is designed as part of the integrated circuits of the communications device **110**B. The miniature cellular tower unit **240**B is directly coupled electrically to the processing device **202** without being connected to the data ports **222**, **224**, such as that shown in FIG. **2**. The housing **250** contains the processing device **202**, memory **204**, transceiver **206**, and miniature cellular tower unit **240**B. The miniature cellular tower unit **240**B is further described below.

FIG. **4** is a block diagram that illustrates an embodiment of a miniature cellular tower unit **240**, such as that shown in FIG. **1**. In this example, the miniature cellular tower unit **240** includes a housing **236** that houses a regular cellular transceiver **404** and is mechanically coupled to the second data port **224**. The regular cellular transceiver **404** is electrically coupled to the second data port **224**. The miniature cellular tower unit **240** includes a miniature cellular transceiver **406** that facilitates routing RF signals between at least two other communications devices **110**.

The miniature cellular tower unit **240** includes a processing device **408** and memory **402** including a routing manager **225** which has instructions that are executed by the processing device **408** of the miniature cellular tower unit **240**. The instructions include logics that facilitate routing cellular network calls and data from and to the at least one other communications device **110**. In this example, the routing manager **225** can be stored and operated at the miniature cellular tower unit **240**; whereas in the previous embodiment, the routing manager **225** is stored and operated at the communications device **110**, such as that shown in FIGS. **2** and **3**.

The routing manager **225** routes RF signals from the at least one other communications device **110** to the cellular tower **105** (FIG. **1**) during an in-use status of the communications device **110**. The in-use status includes the state of the communications device operating in a telephone call or the state of the communications device operating to transmit and receive cellular network data.

Alternatively or additionally, the routing manager **225** routes the RF signals from the at least one other communications device **110** to the cellular tower **105** during an idle status of the communications device **110**. The idle status includes the state of the communications device not operating in a telephone call nor transmitting and receiving cellular network data. Alternatively or additionally, the routing manager **225** determines its routing performance and provides the routing performance to the at least one other communications device **110** so that the at least one other communications device **110** can determine whether to use the communications device **110** for routing cellular networks calls and data.

Alternatively or additionally, the routing manager **225** determines that the routing of the cellular network call or data could switch off or become inaccessible. Responsive to this determination, the routing manager **225** transfers the routing responsibility of the call/data to the at least one other communications device **110** to ensure proper routing of the cellular network calls or data to the cellular network tower **105**.

The routing manager **225** can determine that the cellular tower **105** are closer in distance to the communications device **110** than other communications device **110** and instructs the miniature cellular tower unit **240** to transmit, receive and route cellular voice and data packets to and from the cellular tower directly. Responsive to determining that the cellular tower **105** are farther in distance to the communications device **110** than other communications device **110**, the routing manager **225** instructs the miniature cellular tower unit **240** to transmit, receive and route cellular voice and data packets to and from the cellular tower through other communications devices **110**. This can reduce the number of cellular towers needed. In some cases the cellular tower is even not needed. Change in network technology infrastructure can be easily done since the communications device having the miniature cellular tower unit **240** mentioned above can be configured, designed, or reprogrammed with support to new network technology infrastructure.

FIG. **5** is a view that illustrates an embodiment of an activation graphic user interface (GUI) **505** that can activate a miniature cellular tower unit **240**, such as that shown in FIG. **4**. An activation option (not shown) of the miniature cellular tower unit **240** can be located at a settings menu (not shown) of the communications device **110**. Responsive to selecting the activation option, the routing manager **225** can display the activation GUI **505** on a display (not shown) of a communications device **110**. The user interface **505** facilitates activating the miniature cellular tower unit **240** for routing cellular network calls or data to the cellular tower **105** or the at least one other communications device **110**.

FIG. **6** is a high-level flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager **225**, such as that shown in FIG. **1**, that facilitates routing cellular network calls or data using a communications device **110**. Beginning with block **605**, the routing manager **225** activates a miniature cellular tower unit **240** of the communications device **110** using a user interface **505** of the communications device **110**. At block **610**, the routing manager **225** determines whether radio frequency (RF) signals are good or bad between the communications device and a cellular tower. At block **615**, responsive to the determination that the RF signals associated with the cellular network calls and cellular network data are good, the routing manager **225** establishes connection between the communications device **110** and the cellular tower **105** using the miniature cellular tower unit **240**. At block **620**, the routing manager **225** routes the cellular network calls or data from at least one other communications device **110** to the cellular tower **105**.

FIG. **7** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager **225**, such as that shown in FIG. **2**, that establishes connection for routing cellular calls and data. Beginning at block **710**, the routing manager **225** can initiates connection with a cellular network **100** (FIG. **1**) based on activation GUI **505** (FIG. **5**). At block **720**, the routing manager **225** determines whether a miniature cellular network is enabled. If "yes" at block **720**, the routing manager **225** at block **725** determines whether RF signals associated with the miniature cellular network is detected by the communications device **110**. If "yes" at block **725**, the routing manager **225** at block **730** establishes connection with the cellular network **100** using the miniature cellular network.

If "no" at block **725**, the routing manager **225** at block **735** determines whether RF signals associated with the miniature cellular network and regular cellular network is detected by the communications device **110**. If "yes" at block **735**, the routing manager **225** at block **740** disconnects the connection with the cellular network **100** using the miniature cellular network.

If "no" at block **735** or at block **720**, the routing manager **225** at block **745** determines whether RF signals associated with the regular cellular network is detected by the communications device **110**. If "yes" at block **750**, the routing manager **225** at block **750** establishes connection with the cellular network **100** using the regular cellular network.

FIG. **8** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager **225**, such as that shown in FIG. **2**, that routes cellular calls and data during regular cellular connection. Beginning at block **805**, the routing manager **225** determines whether RF signals associated with the regular cellular network is detected by the communications device **110**. If "yes" at block **805**, the routing manager **225** at block **810** continues to maintain connection with the cellular network **100** using the miniature cellular network.

If "no" at block **805**, the routing manager **225** at block **815** determines whether RF signals associated with the miniature cellular network is detected by the communications device **110**. If "yes" at block **815**, the routing manager **225** at block **820** disconnects the connection with the cellular network **100**.

If "no" at block **815**, the routing manager **225** at block **825** determines whether RF signals associated with the miniature cellular network is detected by the communications device **110**. If "yes" at block **825**, the routing manager **225** at block **830** continues to maintain connection with the cellular network **100** using the miniature cellular network.

FIG. **9** is a flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager **225**, such as that shown in FIG. **2**, that routes cellular calls and data during miniature cellular connection. Beginning at block **905**, the routing manager **225** determines whether RF signals associated with the miniature cellular network is detected by the communications device **110**. If "yes" at block **905**, the routing manager **225** at block **910** continues to maintain connection with the cellular network **100** using the miniature cellular network.

If "no" at block **905**, the routing manager **225** at block **915** determines whether RF signals associated with the regular cellular network is detected by the communications device **110**. If "yes" at block **915**, the routing manager **225** at block **920** continues to maintain connection with the cellular network **100** using the miniature cellular network. If "no" at block **915**, the routing manager **225** at block **925** disconnects the connection with the cellular network **100**.

FIG. **10** is a high-level flow diagram that illustrates an embodiment of the architecture, functionality, and/or operation of a routing manager **225**, such as that shown in FIG. **1**, that routes cellular calls and data during miniature cellular connection. Beginning at block **905**, the routing manager **225** determines whether a destination communications device **110** is reachable through the regular cellular network. If "yes" at block **950**, the routing manager **225** at block **950** continues to maintain connection with the cellular network **100** using the miniature cellular network.

If "no" at block **950**, the routing manager **225** at block **915** determines whether a communications device **110** having, for example, a miniature cellular tower unit **224** is available to route calls and data through the miniature cellular network. If "yes" at block **955**, the routing manager **225** at block **965** determines whether a destination communications device **110** having, for example, a miniature cellular tower unit **224** is available to be reached to receive calls and data through the miniature cellular network. If "no" at block **965**, the routing manager **225** at block **960** determines that a destination communications device **110** cannot be reached through the miniature cellular network and stops transmitting calls and data through the miniature cellular network and can then starts transmitting calls and data through the regular cellular network.

If "yes" at block **965**, the routing manager **225** at block **920** determines that a destination communications device **110** can be reached through the miniature cellular network and starts transmitting calls and data through the miniature cellular network. If "no" at block **965**, the routing manager **225** repeats block **955**.

FIG. **11** is a block diagram illustrating an exemplary architecture for a generic computer **1100** that is similar to the architecture of the computing device, local server and central server, such as that shown in FIG. **5**. As indicated in FIG. **11**, the computing generic computer **1100** comprises a processing device **1110**, memory **1115**, one or more user interface devices **1120**, one or more I/O devices **1130**, and one or more networking devices **1140**, each of which is connected to a local interface **1150**. The processing device **1110** can include any custom made or commercially available processor, a central processing unit (CPU) or an auxiliary processor among several processors associated with the generic computer **1100**, a semiconductor based microprocessor (in the form of a microchip), or a macroprocessor. The memory **1115** can include any one or a combination of volatile memory elements (e.g., random access memory (RAM, such as DRAM, SRAM, etc.)) and nonvolatile memory elements (e.g., ROM, hard drive, tape, CDROM, etc.).

The one or more user interface devices **1120** comprise those components with which the user (e.g., administrator) can interact with the generic computer **1100**. Where the generic computer **1100** comprises a server computer or similar device, these components can comprise those typically used in conjunction with a PC such as a keyboard and mouse.

The one or more I/O devices **1130** comprise components used to facilitate connection of the generic computer **1100** to other devices and therefore, for instance, comprise one or more serial, parallel, small system interface (SCSI), universal serial bus (USB), or IEEE 1394 (e.g., Firewire™) connection elements. The networking devices **1140** comprise the various components used to transmit and/or receive data over networks, where provided. By way of example, the networking devices **1140** include a device that can communicate both inputs and outputs, for instance, a modulator/demodulator (e.g., modem), a radio frequency (RF) or infrared (IR) transceiver, a telephonic interface, a bridge, a router, as well as a network card, etc.

The memory **1115** normally comprises various programs (in software and/or firmware) including an operating system (O/S) (not shown) and routing manager **125**. The O/S controls the execution of programs, and provides scheduling, input-output control, file and data management, memory management, and communication control and related services.

The systems and methods disclosed herein can be implemented in software, hardware, or a combination thereof. In some embodiments, the system and/or method is implemented in software that is stored in a memory and that is executed by a suitable microprocessor (μP) situated in a computing device. However, the systems and methods can be embodied in any computer-readable medium for use by or in connection with an instruction execution system, apparatus, or device. Such instruction execution systems include any computer-based system, processor-containing system, or other system that can fetch and execute the instructions from the instruction execution system. In the context of this disclosure, a "computer-readable medium" can be any means that can contain, store, communicate, propagate, or transport the program for use by, or in connection with, the instruction execution system. The computer readable medium can be, for example, but not limited to, a system or propagation medium that is based on electronic, magnetic, optical, electromagnetic, infrared, or semiconductor technology.

Specific examples of a computer-readable medium using electronic technology would include (but are not limited to) the following: an electrical connection (electronic) having one or more wires; a random access memory (RAM); a read-only memory (ROM); an erasable programmable read-only memory (EPROM or Flash memory). A specific example using magnetic technology includes (but is not limited to) a portable computer diskette. Specific examples using optical technology include (but are not limited to) optical fiber and compact disc read-only memory (CD-ROM).

Note that the computer-readable medium could even be paper or another suitable medium on which the program is printed. Using such a medium, the program can be electronically captured (using, for instance, optical scanning of the paper or other medium), compiled, interpreted or otherwise processed in a suitable manner, and then stored in a computer memory. In addition, the scope of the certain embodiments of the present disclosure includes embodying the functionality of the preferred embodiments of the present disclosure in logic embodied in hardware or software-configured mediums.

It should be noted that any process descriptions or blocks in flowcharts should be understood as representing modules, segments, or portions of code which include one or more executable instructions for implementing specific logical functions or steps in the process. As would be understood by those of ordinary skill in the art of the software development, alternate embodiments are also included within the scope of the disclosure. In these alternate embodiments, functions may be executed out of order from that shown or discussed, including substantially concurrently or in reverse order, depending on the functionality involved.

This description has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the disclosure to the precise forms disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiments discussed, however, were chosen to illustrate the principles of the disclosure, and its practical application. The disclosure is thus intended to enable one of ordinary skill in the art to use the disclosure, in various embodiments and with various modifications, as are suited to the particular use contemplated. All such modifications and variation are within the scope of this disclosure, as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly and legally entitled.

As described herein, an improved method, system and apparatus for providing cellular network coverage and establishing a new cellular network technology infrastructure are presented utilizing a miniature cellular tower unit. This approach takes advantage of the large number of people using smartphones. Due to this there is an increased usage, high demand and high cost to set up infrastructure for evolving new cellular standards. Also, the consumers are affected by low quality due to slow roll-out of network infrastructure and due to congestion. The invention provides a solution to cellular carrier operators by rolling out a new device with a built-in miniature cellular tower unit or external add-on miniature cellular tower unit whenever a new communication devices is released or network standard is released. This way just like how the new devices are adopted, the new infrastructure will also get adopted with minimal cost to the cellular network operators. Also the customers can benefit with better network and connectivity. The cellular network operators can also redeem the customers points/cash etc whenever the miniature cellular tower unit in the customer's communication device participates in routing a connection between any other devices.

Therefore, having thus described the disclosure, at least the following is claimed:

1. A mobile communications device comprising: a processing device; memory including a network manager which has instructions that are executed by the processing device, the instructions including logics that facilitate making and receiving cellular network calls from and to the mobile communications device; a cellular transceiver that wirelessly transmits and receives radio frequency (RF) signals to and from a cellular tower and to and from at least one other mobile communications device; and a miniature cellular tower unit of the mobile communications device includes a second cellular transceiver that wirelessly routes RF signals from the at least one other mobile communications device to the cellular tower, wherein the routed RF signals are associated with the cellular network calls and cellular network data; and the routing is performed also during an idle status of the mobile communications device, wherein the idle status includes a state of the mobile communications device not operating in the cellular network calls or not transmitting and receiving cellular network data.

2. The communications device as defined in claim **1**, wherein the miniature cellular tower unit routes RF signals from the at least one other communications device to the cellular tower during an in-use status of the communications device, wherein the in-use status includes the state of the communications device operating in a telephone call.

3. The communications device as defined in claim **1**, wherein the miniature cellular tower unit routes the RF signals from the at least one other communications device to the cellular tower during an in-use status of the communications device, wherein the in-use status includes the state of the communications device operating to transmit and receive cellular network data.

4. The communications device as defined in claim **1**, wherein the miniature cellular tower unit routes the RF signals from the at least one other communications device to the cellular tower during an idle status of the communications device, wherein the idle status includes the state of the communications device not operating in a telephone call nor transmitting and receiving cellular network data.

5. The communications device as defined in claim **1**, further comprising a housing that contains the processing device, memory, the transceiver, and the miniature cellular tower unit.

6. The communications device as defined in claim **1**, wherein the miniature cellular tower unit includes a regular cellular transceiver that facilitates routing RF signals from the at least one other communications device to the cellular tower.

7. The communications device as defined in claim **6**, wherein the miniature cellular tower unit includes a housing that houses the regular cellular transceiver and is mechanically coupled to a second data port, wherein the second data port is electrically coupled to the regular cellular transceiver, wherein the communications device includes a first data port that is electrically coupled to the memory and processing device of the communications device and connects to the second data port of the miniature cellular tower unit using a data cable.

8. The communications device as defined in claim **6**, wherein the miniature cellular tower unit includes a miniature cellular transceiver that facilitates routing RF signals between at least two other communications devices.

9. The communications device as defined in claim **8**, wherein the miniature cellular tower unit includes:

a processing device; and

memory including a cellular routing manager which has instructions that are executed by the processing device of the miniature cellular tower unit, the instructions including logics that facilitate routing cellular network calls and data from and to the at least one other communications device.

10. The communications device as defined in claim **1**, wherein the miniature cellular tower unit determines its routing performance and provides the routing performance to the at least one other communications device so that the at least one other communications device can determine whether to use the communications device for routing cellular networks calls and data.

11. The communications device as defined in claim **1**, wherein the miniature cellular tower unit determines that the routing of the cellular network call or data could switch off or become inaccessible and responsive to this determination, the miniature cellular tower unit transfers the routing responsibility of the call/data to the at least one other communications device to ensure proper routing of the cellular network calls or data to the cellular network tower.

12. The communications device as defined in claim **1**, further comprising a user interface that facilitates activating the miniature cellular tower unit for routing cellular network calls or data to the cellular tower or the at least one other communications device.

13. A method for routing cellular network calls or data using a mobile communications device, the method comprising: activating a miniature cellular tower unit of the mobile communications device including a second cellular transceiver different from a cellular transceiver of the mobile communication device used for transmitting and receiving radio frequency (RF) signals to and from a cellular tower and to and from at least one other mobile communications device, using a user interface of the mobile communications device; determining whether radio frequency (RF) signals are good or bad between the mobile communications device and a cellular tower; responsive to the determination that the RF signals associated with the cellular network calls and cellular network data are good, establishing wireless connection between the mobile communications device and the cellular tower using the miniature cellular tower unit; and the miniature cellular tower unit wirelessly routing the cellular network calls or data from at least one other mobile communications device to the cellular tower, wherein the routed RF signals are associated with the cellular network calls and cellular network data; and the routing is performed also during an idle status of the mobile communications device, wherein the idle status includes a state of the mobile communications device not operating in the cellular network calls or not transmitting and receiving cellular network data.

14. The method as defined in claim **13**, further comprising routing the RF signals from the at least one other communications device to the cellular tower using the miniature cellular tower during an in-use status of the communications device, wherein the in-use status includes the state of the communications device operating in a telephone call.

15. The method as defined in claim **13**, further comprising routing the RF signals from the at least one other communications device to the cellular tower using the miniature cellular tower unit during an in-use status of the communications device, wherein the in-use status includes the state of the communications device operating to transmit and receive cellular network data.

16. The method as defined in claim **13**, further comprising routing the RF signals from the at least one other communications device to the cellular tower using the miniature cellular tower unit during an idle status of the communications device, wherein the idle status includes the state of the communications device not operating in a telephone call nor transmitting and receiving cellular network data.

17. The method as defined in claim **13**, further comprising:

determining a routing performance of the miniature cellular tower unit; and

providing the routing performance to the at least one other communications device so that the at least one other communications device can determine whether to use the communications device for routing cellular networks calls and data.

18. The method as defined in claim **13**, further comprising:

determining by the miniature cellular tower unit that the routing of the cellular network call or data could switch off or become inaccessible; and

responsive to this determination, transferring the routing responsibility of the call/data by the miniature cellular tower unit to the at least one other communications device to ensure proper routing of the cellular network calls or data to the cellular network tower.

19. A cellular network infrastructure comprising: a cellular tower; and at least one mobile communications device comprising: a processing device; memory including a network manager which has instructions that are executed by the processing device, the instructions including the logics that facilitate making and receiving cellular network calls from and to the mobile communications device; a cellular transceiver that wirelessly transmits and receives radio frequency (RF) signals to and from a cellular tower and to and from at least one other mobile communications device; and a miniature cellular tower unit of the mobile communications device including a second cellular transceiver that wirelessly routes RF signals from the at least one other mobile communications device to the cellular tower, wherein the routed RF signals are associated with the cellular network calls and cellular network data; and the routing is performed also during an idle status of the mobile communications device, wherein the idle status includes a state of the mobile communications device not operating in the cellular network calls or not transmitting and receiving cellular network data.

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